

## GALL MIDGES OF ASTER, CARYA, QUERCUS AND SALIX

By E. P. FELT, *Albany, N. Y.*

The following tabulation of the species reared from the above named plants will prove of service in identifying the midges occurring thereupon. It is extremely interesting to compare the 18 species occurring upon aster with the 35<sup>1</sup> found living at the expense of solidago. It is probable that these lists represent conditions with a fair degree of accuracy, since the data in both instances has been obtained very largely by collections on asters and solidagos in the vicinity of Albany, N. Y., and also at Magnolia, Mass. The tabulation of hickory species shows that many of the midge galls occurring upon this plant are produced by *Caryomyia*, a peculiar and extremely interesting genus which appears to be restricted to this food plant. The same is true in large measure of *Quercus* and *Cincticornia*, this latter *Cecidomyiid* genus probably being confined to the oaks.

The willow, with its dominance in certain localities and numerous species, is also extremely interesting, since it affords sustenance to about 46 species of gall midges, some 5 living upon the leaves, 13 producing bud galls of various kinds, which, in turn, are inhabited by 7 other species, mostly *inquilines*. There are, in addition, 21 species infesting the twigs, a number of these occurring in the slender, very slightly enlarged twigs and hardly producing a gall. A few excavate galleries in the wood, while the majority work in the subcortical tissues. The willow is a marked favorite with *Rhabdophaga*, members of this genus producing conspicuous bud and twig galls. Several species of *Mayetiola* are also found and in one instance at least species belonging to two genera were reared from the same twig.

### Aster

#### *Flower or Bud Galls*

Aborted head on *Aster patens*. Adult, length 4 to 5 mm., dark brown, easily recognized by the broadly, white-banded tarsi.

*Asphondylia moracha* O. S.

Dwarfed or stunted flower heads on *Aster paniculata*. Female, length, 2.5 mm., reddish brown; 19 antennal segments, the fifth with

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<sup>1</sup> 1909, Felt, E. P. Gall Midges of the Goldenrod, *Ottawa Naturalist*, 22: 245-49.

a stem one fifth the length of the cylindric basal enlargement, which latter has a length  $2\frac{1}{2}$  times its diameter.

*Rhopalomyia asteriflora* Felt.

Axillary bud galls on *Aster lateriflorus*, diameter 10 mm. Male, length 1.5 mm., fuscous yellowish; 18 antennal segments, the fifth with a stem as long as the basal enlargement, which latter has a length one half greater than its diameter. Female, length 3 mm., reddish orange; 20 antennal segments, the fifth with a stem one fifth the length of the basal enlargement.

*Rhopalomyia lateriflori* Felt.

#### Blister galls

#### Leaf Galls

Gall yellowish white, nearly circular, 2 to 3 mm. in diameter; on *Aster macrophyllus*. Male, length 2 mm., abdomen dark brown, the segments narrowly white banded; antennal segments 15, the fifth with a length one quarter greater than its diameter, palpi triarticulate. Female, length 1.5 mm., abdomen dark brown; 18 antennal segments, the fifth with a length slightly greater than its diameter.....*Lasioptera clarki* Felt.

Gall yellowish brown, narrowly oval, length 4 mm., diameter 2 mm. Female, length 1.75 mm., abdomen dark brown, the segments narrowly white margined; antennal segments 13, the fifth with a length one third greater than its diameter, palpi uniarticulate.....*Asteromyia*<sup>1</sup> *dumosa* Felt.

Gall brownish, yellow ringed, circular, diameter 3 mm. Male, length 2 mm., abdomen dark brown, the segments narrowly margined; antennal segments 16, the fifth with a length three quarters its diameter, palpi biarticulate. Female, length 2.25 mm.; antennal segments 18.....*Asteromyia waldorfi* Felt.

Gall yellowish, shining, oval, diameter 6 to 7 mm. Female, length 2 mm., abdomen dark brown, the segments narrowly white margined; antennal segments 22, the fifth with a length three quarters its diameter, palpi biarticulate..*Asteromyia nitida* Felt.

Gall pinkish, large, oval blotches on *Aster divaricata*, diameter 10 to 12 mm. Male, length 2 mm., abdomen dark brown, the basal segment sparsely white margined laterally and posteriorly; antennal segments 16, the fifth with a length twice its diameter, palpi uniarticulate. Female, length 2 mm., abdomen dark brown, the segments with submedian white spots; antennal segments 16.

*Asteromyia divaricata* Felt.

<sup>1</sup> *Asteromyia* n. g. This new genus is erected for certain American species previously supposed to be referable to *Baldratia* Kieff. Type *Lasioptera carbonifera* Felt.

Gall yellowish or brownish, irregularly oval, diameter 3 mm. Female, length 2 mm., abdomen dark pulplish brown, the first and second segments margined with reddish orange, the third to fifth broadly margined sublaterally with silvery white; antennal segments 17, the fifth with a length a little greater than its diameter ..... *Asteromyia marginata* Felt.

Gall yellowish or brownish, irregularly oval, diameter 6 mm.; on *Aster paniculata*. Male, length 2 mm., abdomen dark purplish brown; antennal segments 14, the fifth with a length one half greater than its diameter, palpi uniarticulate.

*Asteromyia paniculata* Felt.

Gall greenish yellow or papery white, diameter 1.75 cm.; on *Aster laevis*. Male, length 1.6 mm., abdomen dark brown; antennal segments 14, the fifth with a diameter about equal to its length, palpi uniarticulate..... *Asteromyia leviana* Felt.

Gall sooty yellow beneath, dirty white above, length 2 cm., diameter 1.2 cm. Female, length 2 mm., abdomen black, the segments with submedian white spots; antennal segments 16, the fifth with a length hardly equal to its diameter, palpi uniarticulate.

*Asteromyia flavomaculata* Felt.

Gall yellowish white, dark margined, diameter 3 mm. Female, length 2 mm., abdomen black, the segments sparsely white margined; antennal segments 18, the fifth with a length three quarters its diameter, palpi biarticulate.

*Asteromyia asterifolia* Beutm.

Gall, oval, green swellings, length 2 mm., diameter 1.5 mm. Male, length 1.75 mm., abdomen mostly dark brown; antennal segments 14. Female, length 2 mm., abdomen dark brown, the segments with lunate, submedian white spots; antennal segments 15, the fifth with a length one third greater than its diameter, palpi uniarticulate..... *Asteromyia vesiculosa* Felt.

#### *Stem or Branch Galls*

Gall a small, pustulate swelling on aster stems, diameter 3 mm. Male, length 2 mm., abdomen dark brown, the segments with submedian, lunate, white spots; antennal segments 14, the fifth with a length a little greater than its diameter, palpi uniarticulate.

*Asteromyia pustulata* Felt.

Fusiform stem or branch gall, length 1 cm., diameter .4 cm. Male, length 2.75 mm., abdomen dark brown, the segments with submedian, white spots; antennal segments 19, the fifth with a length greater than its diameter. Female, length 2.75 mm., abdomen dark

brown or black with submedian, white spots; antennal segments 21, the fifth with a length hardly equal its diameter.

*Neolasioptera ramuscula* Beutm.

Greenish brown, fusiform, irregular stem swelling at or near the base of the leaf, length 1 cm., diameter .6 cm., on *Aster infirmus*. Male, length 2.5 mm., abdomen dark brown; antennal segments 20, the fifth with a length hardly equal its diameter. Female, length 3 mm., abdomen dark brown with submedian, lunate, white spots; antennal segments 24 or 25, the fifth with a length three quarters its diameter.....*Neolasioptera albitarsis* Felt.

Oval twig gall on *Aster nova-angliae*. Male, length 2.5 mm., abdomen reddish brown, the segments margined with long hairs; antennal segments 18, the fifth with a stem three quarters the length of the basal enlargement, which latter has a length  $2\frac{1}{2}$  times its diameter, palpi uniarticulate.....*Rhopalomyia astericaulis* Felt.

Ovate, sessile, brownish galls densely white haired, length 7 mm., on *Aster crassulus*. Male, length 1.5 mm., abdomen dark brown basally, lighter distally; 18 antennal segments, the fifth with a stem three quarters the length of the basal enlargement, which latter has a length nearly twice its diameter, palpi biarticulate.

*Rhopalomyia crassulina* Ckll.

## Carya (Hickory)

### Leaf Galls

Cylindric galls.

Greenish or black, 4 to 5 mm. long, 1 mm. in diameter.

*Caryomyia tubicola* O. S.

Conical galls.

Base subglobular with a long, slender apical process, greenish to reddish brown, 3 to 4 mm. long. Occurs in groups on midrib of bitternut hickory.....*Caryomyia caryacola* O. S.<sup>1</sup>

Conical, nearly symmetrical, thin-walled, small, green or red tinted, length 2 mm.....*Caryomyia sanguinolenta* O. S.

Globose galls.

-Smooth or nearly so.

Nearly smooth, thin-walled yellowish green or brown, sparsely haired, usually with a slight nipple, diameter 2 mm.

*Caryomyia caryæ* O. S.

Thin-walled, depressed, yellowish green or brown, diameter 2 to 2.5 mm.....*Caryomyia consobrina* Felt.

<sup>1</sup>*Schizomyia caryacola* Felt was supposed to have been reared from this gall. The one or two specimens obtained were probably accidental.

Thin-walled, probably similar to the above.

*Caryomyia arcuaria* Felt.

Thin-walled without the nipple of *Caryomyia caryæ*, with a yellowish pubescence, diameter 2 to 4 mm. . . . *Caryomia similis* Felt.

Thick-walled, yellowish green or brown, diameter 4 to 5 mm.

*Caryomyia antennata* Felt.

Thin-walled with a false chamber at the apex, diameter 2 to 3 mm.

*Caryomyia inanis* Felt.

Hairy.

Thick-walled, brown or reddish brown, hairs rather short, curly, diameter 6 to 7 mm. . . . . *Caryomyia persicoides* Beutm.

Similar to the above and other *Caryomyia* galls,<sup>1</sup> probably inquiline . . . . . *Clinodiplosis caryæ* Felt.

Thin-walled, rust red, hairs long, straight, diameter 2 to 4 mm.

*Caryomyia holotricha* O. S.

Gall similar to the above, the midge probably inquiline.

*Mycodiplosis holotricha* Felt.

Thin-walled, long haired, melon-shaped, diameter 2 to 3 mm.

*Caryomyia thompsoni* Felt.

Midrib gall.

A rounded, irregular, pale yellowish, hard swelling 12 mm. long.

*Caryomyia cynipsea* O. S.

Forming no gall.

An irregular, yellowish brown margined elevation, diameter 3 mm.

Larva attached by a viscid secretion. . *Caryomyia*<sup>2</sup> *glutinosa* O. S.

#### *Swellings in Husks*

Irregular swelling in the husks produced by pale reddish larvæ.

*Caryomyia*<sup>2</sup> *nucicola* O. S.

### Quercus (Oak)

#### *Fruit*

Reared from larvæ found between the seed coats of an acorn. Female, length 1 mm., abdomen yellowish brown; antennal segments 14, the fifth with a length about  $2\frac{1}{2}$  times its diameter.

*Dasyneura glandis* Felt.

#### *Flower Galls*

Reared from undescribed galls on blossoms of oak. Female, length 1.5 mm., abdomen reddish brown, the basal segment white, the

<sup>1</sup> This species was apparently reared from the gall of *Caryomyia inanis* and that of *C. persicoides*.

<sup>2</sup> The reference of this larva to *Caryomyia* is provisional only.



others with submedian, white spots; antennal segments 33, the fifth with a length three quarters its diameter.

*Lasioptera quercifloræ* Felt.

### Leaf Galls

Leaf edge galls.

Gall a folded leaf edge between serrations. Female, length 1.5 mm., abdomen deep red; antennal segments 14, the fifth with a length  $2\frac{1}{2}$  times its diameter. . . . *Cecidomyia foliora* Rssl. & Hkr.

Similar gall, possibly identical. . . . . *Cecidomyia erubescens* O. S.

Vein galls.

A narrow, dark purplish, fusiform, thin-walled swelling on the under side of the mid or lateral veins may contain two or more orange larvæ, length 8 mm. Male, length 2 mm., abdomen reddish or dark brown; antennal segments 14, the fifth with a length nearly four times its diameter. Female, length 2.5 mm., abdomen dark brown, the fifth with a length four times its diameter.

*Cincticornia podagræ* Felt.

Gall very similar to, if not identical with the above.

*Cincticornia majalis* O. S.

Elongate, pocket-like swellings along midrib of round-leaved scrub oak. Male, length 1 mm., abdomen yellowish brown; 14 antennal segments, the fifth having the basal portion of the stem with a length one half greater than its diameter, the distal part with a length twice its diameter. . . . . *Clinodiplosis florida* Felt.

An elongate fold gall close to the midrib on the under surface, length 12 mm., diameter 1 mm.; on *Quercus tinctoria*.

*Cecidomyia q-oruca* Walsh.

A large midrib fold with a conspicuous white pubescence.

*Cecidomyia niveipila* O. S.

Globose or subglobose, thickened, usually reddish, galls.

Reddish, oval, irregular, wrinkled leaf gall, diameter 3 to 4 mm.

Male, length 3 mm., abdomen dark brown; antennal segments 14.

Female, length 3.5 mm., abdomen dark red; antennal segments 14, the fifth with a length about  $2\frac{1}{2}$  times its diameter.

*Cincticornia pilulæ* Walsh.

A similar gall, apparently Southern, possibly made by the same species. . . . . *Cincticornia symmetrica* O. S.

Gall similar to though much smaller than that of *Cincticornia pilulæ*. Female, length 1.25 mm., abdomen a nearly uniform dark reddish brown; antennal segments 18, the fifth with a length a little greater than its diameter. . . . . *Dasyneura florida* Felt.

Reared from oak, presumably from a gall resembling that made by

Cynips. Male, length 1 mm., abdomen light yellowish with a dark fuscous spot dorsally on the third and fourth segments; antennal segments 14, the fifth having the basal portion of the stem with a length about four times its diameter, the distal part with a length five times its diameter.

*Thecodiplosis quercifolia* Felt.

A subhemispheric, brown, slightly nipped, monothalamous gall on the under side of the leaf, diameter 1.75 mm. Male, length 2 mm., abdomen dark brown; 14 antennal segments, the fifth with a length about three times its diameter. Female, length 2 mm., abdomen reddish orange, the fifth antennal segment with a length fully 4 times its diameter....*Cincticornia globosa* Felt.

Flat, inconspicuous galls.

A flat, relatively inconspicuous, probably blister gall. Male, length 1.5 mm., abdomen dark reddish brown; 14 antennal segments, the third with a length about twice its diameter. Female, length 1.5 mm., abdomen reddish brown, the third antennal segment with a length twice its diameter..*Cincticornia quercifolia* Felt.

A slight circular, blister-like swelling on the lateral veins, length 3 mm., diameter 1 mm. Male, length 2.5 mm., abdomen mostly yellowish orange; antennal segments 14, the fifth with a length three times its diameter. Female, length 2 mm., abdomen with the sclerites dark brown, the membrane and pleuræ deep orange, the fifth antennal segment with a length  $2\frac{1}{2}$  times its diameter.

*Cincticornia americana* Felt.

A broadly, yellow margined, circular, blister gall, diameter 3 mm. Male, length 2 mm., abdomen dark brown; antennal segments 14, the fifth with a length about 4 times its diameter.

*Cincticornia serrata* Felt.

A variable brown, irregularly oval, pustulate swelling 5 to 6 mm. in diameter. Male, length 2 mm., abdomen deep reddish orange; 14 antennal segments, the fifth with a length about three times its diameter. Female, length 2 mm., abdomen dark brown, the fifth antennal segment with a length four times its diameter.

*Cincticornia pustulata* Felt.

An irregularly oval, pustulate swelling 5 to 6 mm. in diameter showing equally on both surfaces but with no nipple. Male, length 2 mm., abdomen dark brown; 14 antennal segments, the fifth with a stem one quarter the length of the basal enlargement, which latter has a length  $2\frac{1}{2}$  times its diameter. Female, length 2 mm., abdomen dark brown, the fifth antennal segment with a length  $3\frac{1}{2}$  times its diameter.....*Cincticornia simpla* Felt.

Probably reared from oak leaves. Male, length 1.5 mm., abdomen reddish brown, the segments thickly margined posteriorly with brown setæ; antennal segments 14, binodose, the basal portion of the stem very short, the distal part with a length one half its diameter.....*Dicrodiplosis quercina* Felt.

#### Twig Galls

Reared from twigs of white oak, *Quercus alba*. Female, length .75 mm., abdomen dark brown, the first segment dorsally silvery white, the second to fourth with submedian white spots; antennal segments 28, the fifth with a length about three quarters its diameter.

*Lasioptera querciperda* Felt.

#### Salix (Willow)

##### Leaf Galls

Fusiform pod or curled leaves, length 10 mm.

*Dasyneura salicifolia* Felt.

Closely rolled terminal leaves.....*Rhabdophaga plicata* Felt.

Yellowish, red spotted, flattened gall, diameter 2 to 3 mm.

*Oligotrophus salicifolius* n. sp.<sup>1</sup>

Subconic, truncate, greenish yellow, lipped gall, diameter 2 mm.

*Hormomyia verruca* Walsh.

Apparently reared from same gall.....*Clinorhyncha filicis* Felt.

##### Bud Galls

Spongy or clustered rosette gall.....*Mayetiola walshii* Felt.

Small, rosette gall, length 2 cm.....*Rhabdophaga racemi* Felt.

Oval, small, rosette gall resembling a small *R. brassicoides* gall.

*Rhabdophaga normaniana* Felt.

Large, loose, rosette gall, length 1 to 2 cm.

*Rhabdophaga rhodoides* Walsh.

Large, open, rosette, or cabbage, gall, diameter 1 to 2 cm.

*Rhabdophaga brassicoides* Walsh.

Reared from above gall.....*Dasyneura orbitalis* Walsh.

Reared from above gall.....*Lestodiplosis septemmaculata* Walsh.

Reared from above gall.....*Rhopalomyia frater* Ckll.

Pine-cone gall, length 2 to 2.5 cm...*Rhabdophaga strobiloides* Walsh.

Reared from above gall.....*Dasyneura annulipes* Walsh.

<sup>1</sup> Male: Length 2 mm., antennal segments 14, the fifth with a stem as long as the basal enlargement, which latter has a length twice its diameter. Mesonotum dark reddish, postscutellum fuscous. Scutellum and abdomen reddish yellow. Legs fuscous straw. Female: Length 2.25 mm., the fifth antennal segment with a length 2½ times its diameter. Abdomen deep red.



Reared from above gall.....*Dasyneura atricornis* Walsh.  
 Reared from above gall.....*Cccidomyia atrocularis* Walsh.  
 Reared from above gall.....*Dasyneura albobittata* Walsh.  
 Reared from above gall.....*Lestodiplosis decemmaculata* Walsh.  
 Pine-cone gall resembling a slender *R. strobiloides* gall.

*Rhabdophaga persimilis* Felt.

Ovate, terminal bud gall, diameter 1 cm.

*Rhabdophaga gnaphaloides* Walsh.

Small bud gall.....*Dasyneura californica* Felt.

Small bud gall.....*Rhabdophaga gemma* Felt.

Reared from apparently normal bud....*Rhabdophaga latcbrosa* Felt.

Small, conic, apical bud gall.....*Dasyneura gemma* Felt.

### Twig Galls

Reared from willow twigs, gall undescribed.

*Asphondylia salictaria* Felt.

Larvæ in subcortical cells, no swelling....*Dasyneura corticis* n. sp.<sup>1</sup>

Slender twigs, slightly enlarged.....*Sackenomyia packardi* Felt.

Slender twigs, slightly enlarged.....*Sackenomyia porterae* Ckll.

Slender twigs, slightly enlarged.....*Mayetiola caulicola* Felt.

Slender twigs, slightly enlarged.....*Rhabdophaga caulicola* Felt.

Twigs probably hardly enlarged.....*Mayetiola perocculta* Ckll.

Slender twigs, slightly enlarged.....*Mayetiola americana* Felt.

Twigs uniformly enlarged, gall 5 to 7 cm. long.

*Rhabdophaga podagræ* Felt.

Gall similar to above, cells in wood....*Rhabdophaga cornuta* Walsh.

Twigs irregularly enlarged, galls 1 to 3 cm. long.

*Rhabdophaga salicis* Schr.

Twigs irregularly enlarged, gall 1 to 3 cm. long, buds dwarfed.

*Rhabdophaga triticoides* Walsh.

Apical, fusiform, beaked gall, length 2 cm....*Mayetiola rigida* O. S.

Reared from similar gall.....*Rhabdophaga sodalitatis* Felt.

Nodular gall at base of twig, length 8 mm.

*Rhabdophaga nodulosa* Walsh.

Inconspicuous knot or twig enlargements..*Mayetiola latipennis* Felt.

<sup>1</sup>Male: Length 2 mm., antennal segments 16, the fifth with a stem three fourths the length of the cylindric basal enlargement, which latter has a length twice its diameter. Mesonotum dull black. Scutellum fuscous yellowish, postscutellum a little darker. Abdomen dull reddish orange. Legs a variable fuscous yellowish. Female: Length 1.75 mm., 15 antennal segments, the fifth with a length 2½ times its diameter. Mesonotum dull brown. Abdomen deep red.

Subglobular, lateral gall with dead area on one side, diameter 9 mm.

*Rhabdophaga globosa* Felt.

Irregular, ovoid or subglobular galls, diameter 1 to 2 cm.

*Rhabdophaga batatas* Walsh.

Same gall as above.....*Rhabdophaga ramuscula* Felt.

Same gall dried.....*Asynapta saliciperda* Felt.

Subglobose galls, the surface scarred, diameter 4 mm.

*Mayetiola tumidosae* Felt.

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## SOME NEW SPECIES OF WEEVILS OF ECONOMIC IMPORTANCE

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I beg the indulgence of my colleagues for combining in a single article purely taxonomic matter with a discussion of biologic and economic subjects. My plea is that the course I follow shows in a rather striking manner the close interrelationship between the economic and systematic branches of our science.

In a recent publication on the "Parsley Stalk Weevil (*Listronotus latiusculus* Boh.)," Dr. F. H. Chittenden cites examples of serious damage done by the semi-aquatic weevils *Listronotus appendiculatus* Boheman and *Notaris puncticollis* LeConte to cabbage in Ohio, and by *Listronotus latiusculus* Boheman to parsley in Virginia. He cites in addition, the tendency of the genus *Sphenophorus* to attack corn (Bur. Ent., bul. 82, part II, p. 14). These are all examples of the results of planting crops on newly drained land, when weevils which normally inhabit marshes have depredated on cultivated crops.

This brief notice describes a phenomenon in the biologies of weevils which is by no means uncommon, although perhaps not well understood as yet.<sup>1</sup> There are among our American weevils several very sharply defined groups of forms without wings or with rudiments of wings only. The classification of LeConte and Horn overlooks this important character and by raising other characters to primary importance has obscured it and dissociated what appear to the writer to be nearly related forms. The majority of these wingless weevils pass their developmental period in the ground at the roots of plants. Whenever it happens that land is cleared, and the plants eliminated have been the hosts of multitudes of these weevils, it is almost certain

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<sup>1</sup> This paper deals only with weevils, however workers in other groups will recognize the existence of the same phenomenon.